UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/035,346	12/28/2001	John de Q. Walker	01-152	1045

24319 7590 10/02/2003

LSI LOGIC CORPORATION
1621 BARBER LANE
MS: D-106 LEGAL
MILPITAS, CA 95035

EXAMINER	
NADAV, ORI	

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 10/02/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicati n No. 10/035,346	Applicant(s) WALKER ET AL.	
	Examiner ori nadav	Art Unit 2811	

-- The MAILING DATE of this communication appears on th cover sh et with the c rresp ndence address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,5-7 and 11-17* is/are pending in the application.

4a) Of the above claim(s) *11-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3 and 5-7* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Stover et al. (3,914,708).

Regarding claim 1, Stover et al. teach in figure 2a and related text a varactor comprising: a diode junction 26/12; a depletion region (see figure 3) adjacent to the diode junction; and a doped region 12 (see figure 1c) including the depletion region and having a nonuniform dopant concentration profile that continuously increases with increasing depth of the doped region from the diode junction 32, 46 (see figure 3); and wherein the nonuniform dopant concentration profile causes the varactor to have an approximately linear capacitance/voltage response characteristic (see figures 4a and 4b and column 6, lines 7-8), wherein: the doped region includes a peak dopant concentration region 34, 47 outside the depletion region (see figure 3); and the peak dopant concentration region forms a conductive path to and from the varactor.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stover et al. in view of Sze.

Regarding claims 3 and 5, Stover et al. teach substantially the entire claimed structure, as applied to claim 1 above, except stating that the nonuniform dopant concentration profile is defined by an equation N=Bxexp(m), where N is the dopant concentration, x is the depth of the doped region, B is a concentration constant and m is an exponent that determines the degree of curvature of the dopant profile, wherein m is about 3.

Sze teaches that a nonuniform dopant concentration profile is defined by the equation N=Bxexp(m), where N is the dopant concentration, x is the depth of the doped region, B is a concentration constant and m is an exponent that determines the degree of curvature of the dopant profile, wherein m is greater than zero.

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a nonuniform dopant concentration profile defined by the equation N=Bxexp(m), where N is the dopant concentration, x is the depth of the doped region, B is a concentration constant and m is an exponent that

determines the degree of curvature of the dopant profile, wherein m is about 3 in Stover et al.'s device, because the above equation is known to define a nonuniform dopant concentration profile, and in order to provide the closest characteristics to those of an ideal varactor, respectively.

Regarding claims 6-7, Stover et al. teach in figure 3 that B is in the range from about 1.OE13/cm3 to about 1.OE19/cm3, and about 1.OE16/cm3.

Response to Arguments

3. Applicant argues that Stover et al. do not teach a continuously increasing nonuniform dopant concentration profile causes the varactor to have an approximately linear response, as required by claim 1.

Claim 1 does not recite a continuously increasing nonuniform dopant concentration profile causes the varactor to have an approximately linear response. Claim 1 recites a doped region having a nonuniform dopant concentration profile that continuously increases with increasing depth of the doped region. Claim 1 further recites a nonuniform dopant concentration profile causes the varactor to have an approximately linear capacitance/voltage response characteristic. Stover et al. teach in figure 2a and related text a doped region 12 (see figure 1c) including the depletion region and having a nonuniform dopant concentration profile that continuously increases with increasing depth of the doped region from the diode junction 32 (see figure 3); and wherein the

nonuniform dopant concentration profile causes the varactor to have an approximately linear capacitance/voltage response characteristic (see figures 4a and 4b and column 6, lines 7-8),

Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is **(703) 308-8138**. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas, can be reached at **(703) 308-2772.**

Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

O.N.
September 16, 2003

ORI NADAV
PATENT EXAMINER
TECHNOLOGY CENTER 2800